Paper No. 18

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DIETER BRUCK and UDO WOLF

Appeal No. 2002-0984
Application 09/246,179[1]

ON BRIEF

Before METZ, GARRIS and MOORE, Administrative Patent Judges.

METZ, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the examiner's refusal to allow claims 6 through 10, all the claims remaining in this application..

THE INVENTION

The appealed subject matter is directed to a process for the production or modification of polymeric products by monitoring a reaction designed to produce or modify a polymeric product using infrared attenuated total reflection (**IR**-**ATR**) probes to measure

---

[1] Application for patent filed February 4, 1999.

the absorption of the reaction media, calculating the degree of conversion based on the absorption values measured and modifying or terminating the process when the desired effect has been obtained.

Claim 6 is believed to be adequately representative of the appealed subject matter and is reproduced below for a more facile understanding of the claimed invention:

> Claim 6. A process for the controlled production of polymeric products and/or modification of polymeric products comprising
>
> **a**) determining characteristic **IR** absorption bands for the starting material and the desired product,
>
> **b**) determining the absorbance of the characteristic **IR** absorption bands from **a**),
>
> **c**) immersing an **IR**-**ATR** probe in an agitated reactor having contents with a maximum viscosity of 10,000 Pas and flow velocity of from 0.01 to 10m/sec at the probe location,
>
> **d**) measuring absorption directly by means of the **IR**-**ATR** probe at short time intervals during the production or modification reaction,
>
> **e**) calculating degree of conversion and/or degree of modification of the reactor contents using one of the following equations:

$$\mathbf{M(t)} = 100 - \mathbf{A(t)/A(t_o)} \bullet 100\ (\%)$$

or

$$\mathbf{U(t)} = 100 - \mathbf{A(t)/A(t_o)} \bullet 100\ (\%)$$

in which

M(**t**) = degree of modification;

U(**t**) = degree of conversion;

A(**t**) = absorbance of the characteristic absorption band of the starting material at time **t**, and

A($\mathbf{t_o}$) = absorbance of the characteristic absorption band of the starting material at time $\mathbf{t_o}$ (i.e., start of the reaction), and

f) terminating the production or modification reaction when the desired degree of reaction or modification has been reached.

THE REFERENCES

The references of record which are being relied on as evidence of obviousness are:

Doyle (Doyle '389)	4,835,389	May 30, 1989
Doyle (Doyle '551)	5,051,551	September 24, 1991
Berard et al. (Berard)	5,170,056	December 8, 1992
Doyle (Doyle '825)	5,773,825	June 30, 1998

"*Ullmann's Encyclopedia of Industrial Chemistry*", Volume A23, pages 322-324, 1993 (Ullmann's)

THE REJECTION

Claims 6 through 10 stand rejected as being unpatentable under 35 U.S.C. § 103 as the subject matter therein claimed would have been obvious at the time appellants made their invention from the disclosure of any of Berard, Doyle '389, Doyle '551 or Doyle '825 considered with Ullmann's and "Examiner's Notice."

OPINION

We begin by determining the scope and content of appellants' claims because it is the claims which define the protection for which appellants seek a patent. United Carbon Co. v. Binney & Smith Co., 317 U.S. 228, 232, 55 USPQ 381, 383-384 (1942) (citing General Electric Co. v. Wabash Appliance Corp., 304 U.S. 364, 369, 37 USPQ 466, 468-469 (1938); In re Zletz, 893 F.2d 319, 321, 322, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989); SRI Int'l. v. Matsushita Elec. Corp., 775 F.2d 1107, 1121, 227 USPQ 577, 586 (Fed. Cir. 1985) (en banc). We shall apply our analysis to representative claim 6, appellants' broadest, independent claim.

Claim 6 is directed to a process "comprising" 6 (six) specific steps denominated as steps **a**) through **f**). As a "comprising" claim, claim 1 requires the recited steps but does not exclude any other steps disclosed in the prior art, including both those disclosed but not claimed by appellants and those neither disclosed nor contemplated by appellants. In re Baxter, 656 F.2d 679, 686, 210 USPQ 795, 802 (CCPA 1981). Thus, claim 6 requires the 6 (six) recited steps but does not exclude any other steps.

The first two steps of the process in claim 6 are directed to establishing the characteristic properties of the "polymeric product" being "produced" or "modified." These properties are

monitored during the process and are used to determine the progress of the reaction as determined by the infrared attenuated total reflectance spectrophotometer. In the third step, the **IR-ATR** probe is immersed in "an agitated reactor" which reactor contains the "polymeric product" and other unidentified reactants. The "contents" of the reactor have a maximum viscosity of 10,000 Pas[2] and a "flow velocity" of from 0.01 to 10 meters per second at the probe location. In the fourth step, the absorption of the contents of the agitated reactor is measured during the "production" or "modification" reaction using the **IR-ATR** probe to measure the absorption. In the fifth step, the absorption values measured in the fourth step are used to calculate the "degree of conversion and/or degree of modification" of the contents of the agitated reactor. Stated another way, the values measured for the absorption of the particular species being monitored indicate the progress of the reaction in the agitated reactor. According to the fifth step of the process, the degree of modification (**M**(**t**)) or the degree of conversion (**U**(**t**)) of the species of interest being monitored are calculated using one of two formulae. We observe that the formulae are identical. Thus, the formulae require that the ratio

[2] Pas or Pa●s is the abbreviation for Pascal second. 1 Pas is equal to 1000 centipoise (dynamic viscosity). Water, for example, has a viscosity at 20°C of 1.00 centipoise or 0.001 Pas.

of the absorbance for species being measured in real time to the absorbance for the same species at the outset of the reaction is determined, subtracted from 100 and converted to a percentage. In the sixth step, the "production" or "modification" reaction is terminated when, apparently, the degree of conversion or modification determined in the fifth step representing the "desired degree of reaction or modification" has been achieved.

As we have demonstrated by our analysis above, the claimed process is generic to production of either unidentified "polymeric products" and/or "modification" of unidentified "polymeric products." Appellants' sole disclosure in their specification of any useful process is directed to the "modification" alternative of claim 6. Specifically, at pages 7 through 9 of the specification, appellants disclose monitoring the degree of hydrogenation of unidentified "nitrile rubbers" in a solution of chlorobenzene using "the **IR**-**ATR** method." Thus, the "nitrile rubbers" are "modified" by reducing the degree of unsaturation in the polymers by hydrogenating 225 grams of them in 1275 grams of chlorobenzene in an autoclave using triphenylphosphine and a rhodium catalyst.

Thus, although the claims are not what we consider to be a model of clarity, they possess adequate specificity and can be read, after reading them in light of appellants' specification as they would be understood by the hypothetical person of ordinary

skill in the art, to encompass at least one reasonably definite meaning which enables us to review the prior art in the context of what appellants' claims reasonably may be said to embrace. See In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

In finding an applicant for patent is not entitled to a patent, the PTO (the examiner) bears the burden of proving lack of entitlement whether under 35 U.S.C. § 101, § 102, § 103 or § 112. The examiner's burden or proof in denying a patent to an applicant for patent, except for issues of "fraud" or "violation of the duty of disclosure" which requires clear and convincing evidence, is by a preponderance of the evidence. In re Caveny, 761 F.2d 671, 674, 226 USPQ 1, 3 (Fed. Cir. 1985). A preponderance of the evidence has been defined as a standard which only requires the fact finder :

> to believe that the existence of a fact is more probable than its nonexistence before [he] may find in favor of the party who has the burden to persuade the [judge] of the fact's existence.

Boises v. Benedict, 27 F.3d 539, 541-42, 30 USPQ2d 1862, 1864 (Fed. Cir. 1994), quoting from In re Winship, 397 U.S. 358, 371-72 (1970).

The examiner's rejection is founded on evidence in the nature of the patents and the literature reference on which he has relied to reject the claims. Additionally, the examiner has relied on "Examiner's Notice" in support of his rejection.

According to the examiner's stated rejection in the first office action (Paper Number 5), the "Examiner's Notice" was explained as follows:

> The flow viscosity [sic, velocity] in the vicinity of the probe appear [sic, appears] to be within that expected for a typical stirred reaction mixture, or lacking a showing to the contrary, not unobvious thereover. The Examiner takes notice that determining what spectral absorptions to use and calculation of the degree of reaction from the spectral data is ordinary and well within the capabilities of one of ordinary skill in the art. It also would be considered to be obvious to one of ordinary skill in the art to take measurements at appropriate time intervals to follow the course of the reaction. Such intervals would appear to be well within the time intervals of the instant claims or not unobvious thereover.

In responding to the examiner's rejection, appellants challenged the "Examiner's Notice" as not being founded on any underlying evidence which supported the examiner's conclusions of obviousness. The appellants asserted that the claimed process was not obvious for any of the reasons given by the examiner (Paper Number 7).

In the final rejection (Paper Number 9) the examiner responded to appellants by stating it was not clear "what argument applicant would make to cast a reasonable doubt on the circumstances regarding the Examiner's Notice." The examiner concluded that only after appellants presented an argument casting reasonable doubt on the "Examiner's Notice" would he be forthcoming with the references he alleged to possess and which references would also establish "these well known facts."

In his answer, the examiner "takes Notice" that the determination of spectral absorptions and the calculation of the degree of the reaction from spectral data "is ordinary and well within the capabilities of one of ordinary skill in the art." The examiner also concludes that it would have been obvious to take measurements at appropriate time intervals to follow the course of the reaction. The examiner observes in his answer that although the appellants had failed to respond to the reliance by the examiner on the "Examiner's Notice" in their response to the final rejection, appellants have now raised the argument in their brief but observes that appellants have not provided any basis to cast doubt on the "circumstances regarding the Examiner's Notice." The examiner then attempts to explain the basis for the "Examiner's Notice" by: making unsupported conclusions; referencing unidentified textbooks which allegedly support the "Examiner's Notice"; and, invoking Beer's law for the proposition that calculating changes in concentration from changes in the level of absorption would have been within the skill of the routineer in the art.

In the first instance, the examiner's unwillingness to provide appellants with evidence which, on the record, the examiner alleged to have in his possession and which evidence would have supplied the underlying foundation for the examiner's legal conclusion of obviousness, was improper. The examiner's

requirement that appellants make arguments which cast reasonable doubt on the "Examiner's Notice" evidences a misunderstanding of the law. It is the **examiner's** burden to make out a *prima facie* case of obviousness of the claimed subject matter based on a preponderance of the evidence. Appellants were not required to rebut the examiner's mere conclusion of obviousness where that conclusion was not supported by **any** evidence, let alone a preponderance of the evidence. Further, it is of no moment that appellants did not respond to the examiner's continued reliance on the "Examiner's Notice" in their response to the final rejection. What is relevant is that appellants have made that argument in their brief.

Further, it may be appropriate under certain circumstances to take official notice of a fact so notorious that it is capable of instant and unquestionable demonstration. The boiling point of water or the fact that under normal ambient conditions hydrogen is a gas are examples of such facts. However, as the court observed in In re Ahlert, 424 F.2d 1088, 1091, 165 USPQ 418, 420, 421 (CCPA 1970):

> Assertions of technical facts in areas of esoteric technology must always be supported by citation to some reference work recognized as standard in the pertinent art and the appellant given, in the Patent Office, the opportunity to challenge the correctness of the assertion or the notoriety or repute of the cited reference. (citations omitted) Allegations concerning specific "knowledge" of the prior art, which might be peculiar to a particular art should also be supported and the appellant similarly given

> the opportunity to make a challenge. (citations omitted) Where the appellant has failed to challenge a fact judicially noticed and it is clear that he has been amply apprised of such finding so as to have the opportunity to make such challenge, the board's finding will be considered conclusive by this court. (citations omitted)

The examiner's action here is exacerbated because his findings, disguised in the nature of the "Examiner's Notice", have not been shown to be facts, have not been supported by citations to any reference, have been challenged by appellants and go to the very limitations in the claimed process which may be considered to distinguish the claimed process from the prior art. Our reasoning in support of this statement follow immediately below.

We find each of the Doyle references on which the examiner has relied is evidence which establishes that **IR**-**ATR** spectroscopy has been used to monitor a variety of chemical reactions, including reactions conducted in "kettles" which are closed vessels in which the reactants to be reacted are contacted and stirred. The disclosure in Berard is extremely similar to that in the Doyle references. Further, Berard includes two specific examples of monitoring the progress of chemical reactions using **IR** spectroscopy, specifically optical fiber cylindrical internal reflectance. In one example the conversion of an aldehyde to the corresponding alcohol was measured by measuring instantaneously during the reaction the concentration of the aldehyde versus the concentration of the alcohol. In another example the preparation

of a product (cobalt carbonyl complex) was measured based on the disappearance of the reactant (dicobaltoctacarbonyl). Ullmann's generically recognizes that the modification of nitrile rubber (degree of hydrogenation) may be determined by infrared spectroscopy.

Recognizing that none of the Doyle references or the Berard reference teaches or suggests using **IR**-**ATR** spectroscopy for monitoring the "production" or "modification" of polymeric products, the examiner relies on Ullmann's generic disclosure of using infrared spectroscopy for monitoring the modification of "polymeric products" as evidence that the claimed process would have been obvious. Nevertheless, no reference on which the examiner has relied discloses the formula required by step **e**) of claim 6 and no reference discloses both the viscosity and velocity conditions around the probe required by step **c**) of claim 6. The examiner proclaims that the parameters defining one or both of these conditions in the vicinity of the probe "appear to be within that expected for a typical stirred reaction mixture, or lacking a showing to the contrary, not unobvious thereover." As for the calculations in step **d**) of claim 6, the examiner pronounces under the rubric of "the Examiner's Notice" that determining which spectral values to measure and calculating the degree of the reaction from those values are "well within the capabilities of one of ordinary skill in the art."

We find that Berard may be considered as evidence that it was well known in the art at the time appellants made their invention to monitor a chemical reaction by spectrally determining when a specific starting material in the original reaction mixture disappeared and when a particular, expected product appeared. But this still leaves the question of whether the conditions at the probe which are specifically recited in claim 6 have been shown to be "obvious" within the sense of the statute.

Appellants urge that because the claimed process deals with polymeric products or modified polymeric products the question of whether **IR**-**ATR** technology would have been expected to be useful in polymeric reaction systems remained open to doubt and is not shown by any reference. See page 6 of the brief. The examiner has not rebutted this argument but has conceded no reference discloses the use of **IR**-**ATR** technology in polymeric systems. See page 3 of the examiner's answer. Further, appellants allege to have discovered that for good results using **IR**-**ATR** technology in polymeric reaction systems it is essential for the reactor to be agitated, that the contents have a particular maximum viscosity and the **IR** measurements made at the probe. No evidence on which the examiner relies addresses these limitations let alone discloses them. While Ullmann's does disclose the use of infrared spectroscopy for monitoring modification of polymeric products,

generally, Ullmann's does not disclose or suggest the use of **IR-ATR** spectroscopy at all and none of the Doyle or Berard references teach or suggest the limitation in step **c**) of claim 6.

If, as the examiner has suggested, he indeed has in his possession the evidence which would have established these parameters to be known, he should have come forward with that evidence during the prosecution of this application. While we agree with the examiner's observation that the scope of claim 6 is considerable, to make out a *prima facie* case of obviousness it remains the examiner's burden to present evidence of obviousness of the subject matter claimed. It is not, as the examiner has stated in his answer, appellants' burden to rebut the examiner's unsupported allegations and conclusions of obviousness. Therefore, based on this record, we are constrained to reverse the rejections because he has failed to meet his burden of proof.

Accordingly, we conclude that the examiner has failed to make out a *prima facie* case of obviousness based on the combination of any of Doyle '389, Doyle '551, Doyle ''825 or Berard considered with Ullmann's and the "Examiner's Notice."

SUMMARY

The rejections of claims 6 through 10 under 35 U.S.C. § 103 are **reversed**. The decision of the examiner is **reversed**.

REVERSED

ANDREW H. METZ Administrative Patent Judge	)
BRADLEY R. GARRIS Administrative Patent Judge	)BOARD OF PATENT) APPEALS AND)INTERFERENCES
JAMES T. MOORE Administrative Patent Judge	)

AHM/gjh

PATENT DEPARTMENT
BAYER CORPORATION
100 BAYER ROAD
PITTSBURGH, PA 15205-9741